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A preliminary report on the traditional practice for dental and oral health care in Bargarh district of western Odisha, India

Maninee Sahu and Alok Ranjan Sahu

Abstract

An ethno-medicinal survey was conducted during January 2011 to December 2016 to investigate the traditional knowledge of local people of Bargarh district in the state of Odisha, India. Data were collected by interviewing native and elderly people engaged in health practice in different villages. The investigation reveals that 57 different important plant species belonging to 33 families are being commonly used. Besides, bark, leaf and rhizome as such or being processed are used as tooth powder. In few cases the latex, juice or oil extracted from seeds are either directly applied on the effected tooth and gums or gurgled for relief. Moreover, out of 55 plant species, 24 are exclusively used for tooth stick, 24 for toothache due to caries, 16 for gum diseases and 11 species for pyorrhea, used for oral health care. Maximum numbers of five species are reported each from family Fabaceae and Moraceae followed four species by member of Rutaceae and three species each from Liliaceae and Malvaceae. During the investigation it was observed that people Bargarh district still continue to depend on plant resources to meet their day-to-day needs and use plant based formulations from generation to generation for treatment of health related problems. This traditional knowledge is passed from generation to generation orally. There is no documentation of such knowledge and it is expected that with the death of elderly people the knowledge may be lost. Hence, the present paper aims of documenting the traditional knowledge of dental and oral health care.

Keywords: Dental problems, medicinal plants, oral diseases, teeth, traditional knowledge

Introduction

India has one of the world's most sophisticated indigenous medical cultures, with an unbroken tradition coming down across more than four millennia. Though this medical heritage is several centuries old, even today people in the rural and remote areas depend upon it for their health care needs. According to WHO report ^[10], over 80% of the world population relies on traditional medicine for their primary health care needs (Sahu *et al.*, 2016) ^[8]. Investigation of traditional medicine is an inexplicably attractive yet, scientifically important and economically essential task of ethnobotanists. In past few decades pioneer work in identification, documentation and detection of traditional medicine has been made in India. Ethnobotanical studies are often significant in revealing locally important plant species especially for the discovery of crude drugs (Jain, 1981) ^[4]. The science of ethnobotany is concerned with the relationships between man and vegetation involving man's dependence upon vegetation as well as the tremendous influence man has had on vegetation (Farnsworth, 1998) ^[1]. Right from its beginning, the documentation of traditional knowledge, especially medicinal uses of plants, has provided many essential drugs of modern day (Pushpagadan and Kumar, 2005) ^[5]. Investigation of traditional medicine is very much essential for the welfare of rural and tribal communities for treatment of conventional illness. This is due to the health care facilities in rural areas are inadequate and expensive too. Moreover, traditional medicine based on plants provides utmost rural or tribal healthcare, because 80% of the raw materials used in the preparation of drugs obtained from medicinal plants (Sahu *et al.*, 2010; Sahu *et al.*, 2013 and Sahu *et al.*, 2016) ^[6, 7, 8].

Oral hygiene is a central part of health of a person. Oral health when neglected, results in different types of oral ailments like dental caries and periodontal diseases. Oral disorders can significantly affect the general well-being of a person by causing considerable pain and discomfort, thus affecting their quality of life. The mouth is the mirror that can imitate the health of the rest part of our body *i.e.* there is an assembly between oral health and general

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Before the field work started, a literature survey was carried out on the study area (Sahu *et al.*, 2010; Sahu *et al.*, 2013 and Sahu *et al.*, 2016) [6, 7, 8]. The study area was visited regularly and close interaction were made with the senior tribal people involved with herbal medicines. During field work, interviews were conducted with local educated villagers, the herbal healer called 'Kabiraj' or 'Vaidyas' (local physicians in Indian System of Medicine), old woman and medicinal plant vendors. The plant specimens were collected and identified with local flora (Saxena and Brahmam, 1994-1996) [9]. Some of the elderly people practicing such herbal medicines did not easily reveal the truth directly, so indirect methods adopted to extract directly or indirectly. Moreover common tribal people were also contacted to know about their common ailments and healing methods for dental and oral care. All information thus collected were scrutinized and compiled in a tabular form.

Results

A total of 55 plant species belonging to 50 genera and 32 families have been recorded to treat different oral and tooth ailments. Maximum numbers of five species are reported each from family Fabaceae and Moraceae followed four species by member of Rutaceae and three species each from Liliaceae and Malvaceae. The use of specific plant parts such as twigs as tooth stick for general brushing was highest (24). Besides, bark, leaf and rhizome as such or being processed are used as tooth powder. Also raw leaf, bark, root and pericarp are chewed to remove the bad breath and infection. In few cases the latex, juice or oil extracted from seeds are either directly applied on the effected tooth and gums or gurgled for relief. Moreover, out of 57 plant species, 24 are exclusively used for tooth stick, 23 [*Abutilon indicum* L., *Achyranthes aspera* L., *Allium cepa* L., *Allium sativum* L., *Alstonia scholaris* L. R. Br., *Azadirachta indica* A. Juss., *Barringtonia acutangula* L., *Capsicum frutescens* L., *Cinnamomum tamala* Nees., *Cocos nucifera* L., *Hemidesmus indicus* (L.) R. Br., *Jatropha curcas* L., *Lawsonia alba* Lamk., *Madhuca indica* Gmel., *Mangifera indica* L., *Milletia pinnata* (L.) Panigrahi, *Mukia maderaspatna* (L.) Roem., *Murraya paniculata* (L.) Jack., *Psidium guajava* L., *Smilax zeylanica* L., *Terminalia arjuna* Retz., *Vitex negundo* L., *Zingiber officinale* L.] species for toothache due to caries, 16 for gum diseases and nine species (*Alstonia scholaris* L. R. Br., *Butea monosperma* (L.) Taub., *Jatropha curcas* L., *Madhuca indica* Gmel., *Mimusops elengi* L., *Psidium guajava* L., *Smilax zeylanica* L., *Terminalia arjuna* Retz., and *Vitex negundo* L.) for pyorrhea (Table 1). Oils extracted from seeds of two plants *Brassica juncea* (L.) Czern. and Coss, and *Helianthus annuus* L. are either gurgled or applied as lotion on inflammatory gums. Further, the seeds of *Solanum virginianum* Linn. are burnt and smoked like cigarette for relief from toothache. Moreover, the leaves of *Aegle marmelos* (L.) Corr., *Mentha viridis* L., *Ocimum sanctum* L. and flower buds of *Syzygium aromaticum* (L.) Merrill & Perry are chewed to prevent bad breath from mouth.

Discussion

The present world markets are flooded with variety of tooth pastes, tooth brushes, gels mouth wash liquids and corers of rupees are spent on their advertisement, circulation and

promotion. But, so far as the cost factor is concerned, few people in India can afford it when the population below poverty line in India and Odisha are 29.9 and 44.7 respectively (Tripathy, 1994) [10]. The economic milieu of other developing countries is no way better than India. Moreover, some cosmetic and medicine companies in Egypt, India, Pakistan, Switzerland and U.K. have also been applied this knowledge for manufacturing tooth pastes. The most popular brand in India is 'Dabur Babool-New Babool power with clove' which claims to contain the natural extracts of 'Babul' (*Acacia nilotica* L.) and manufactured by Dabur India Limited, New Delhi, India. 'Dabur RED' which claims to contain the natural extracts of 'Laung' (*Syzygium aromaticum* (L.) Merrill & Perry), 'Pudina' (*Mentha viridis* L.), 'Tomar' (*Zanthoxylum alatum* DC.) and manufactured by Dabur India Limited, New Delhi, India. Many others companies also used herbs for the production of toothpaste and mouth fresheners. Meswak is scientifically formulated herbal toothpaste with pure extract of the Miswak plant '*Salvadora persica*', the famous 'Toothbrush Tree' used for centuries. Miswak is a rare herb, potent, priceless, wonder herb that delivers incredible Oral Care benefits. It grows slowly resisting the brutal forces of nature amongst the sand dunes of Africa and South Asia. Meswak toothpaste is manufactured by Dabur India Limited, New Delhi, India. It is scientifically proven to reduce tarter and plaque, fights germs & bacteria to keep gums healthy, helps prevent tooth decay, eliminates bad breath and ensures strong teeth. Dabur Meswak provides Complete Oral Care. In addition, when the modern mouthwash solutions do nothing more than camouflaging the unpleasant breath for a limited period (Dhilon, 1994) [2], the leaves reported in this study are claimed to remove the bad smell from the mouth along with their other medicinal actions. The higher population explosion and limited resources in India demand that some alternative means of organizing oral health and care be examined and implemented (Anonymous, 1994) [1]. In this context, phytotherapy resources for oral health care appear relevant as it requires no special resources, sophistication or expertise in production, preparation and usage. So it has become a necessity to collect record and pharmacologically evaluate the useful alkaloids, tannins, resins or any other beneficial plant product available from the local vegetation for better oral and dental care in Odisha. Medicinal plants, which form the backbone of traditional medicine, have in the last few decades been the subject for very strong pharmacological studies; this has been brought about by the acknowledgement of the value of medicinal plants as probable sources of new compounds of therapeutic value. Traditional medicine is a talent practiced by few elderly people whose experimental knowledge is appreciated by everyone in the village. Plant-based traditional knowledge has become a standard tool in search for new sources of drugs, it is clear that these herbal medicines can offer a platform for further research in dentistry. During the study period, it was also observed that elderly people have more knowledge about these traditional herbal medicines. Present study reveals that medicinal plants continue to play a major role in dental care needs of native peoples of Bargarh district. Hence there is an urgent need to protect the biodiversity as well as the traditional knowledge by correct documentation and for further research in dentistry.

Table 1: Medicinal plants and their traditional uses for the treatment of a variety of dental problems and oral care by the natives of Bargarh District, Western Odisha.

Botanical Name	Local Name	Family	Plants parts with ethnomedicinal uses for dental and oral care
<i>Abutilon indicum</i> L.	Kuthelchitra	Malvaceae	Small branches are cut in to small pieces and used as tooth brush to clean the teeth. Further The leaf paste is used for the treatment of toothache.
<i>Acacia catechu</i> (L.f.) Willd	Khayar.	Fabaceae	Power of stem bark is used to cure bleeding gums and sores.
<i>Acacia nilotica</i> L.	Bamur	Fabaceae	The branches are cut in to small pieces and used as tooth brush without any tooth paste. The bark powder is used as a tooth paste.
<i>Achyranthes aspera</i> L.	Apamarga	Amaranthaceae	Small branches are cut in to small pieces and used as tooth brush; mixture of the twig is also used as a wash for tooth pain. The dried root powder is used as tooth paste and it used to treat gum disorders. Further Soak cotton in the extract of 3-4 leaves and apply it on aching tooth. It also helps in filling and healing up of old time cavities.
<i>Aegle marmelos</i> (L.) Corr.	Bel	Rutaceae	Shoot occasionally used as tooth brush Leaf on chewing removes bad breath and check infection.
<i>Allium cepa</i> L.	Uel	Liliaceae	Bulb juice used to cure toothache, bleeding gums.
<i>Allium sativum</i> L.	Lesun	Liliaceae	The paste of the bulb is applied to the gums and cavities of infected teeth.
<i>Aloe vera</i> L.	Gheekuanri	Liliaceae	Leaf paste is used in oral wound healing.
<i>Alstonia scholaris</i> L. R. Br.	Chatiana	Apocynaceae	Milky juice of stem bark used on toothache in order to get relive from pain. Further, Latex used as external lotion on tooth and gum to check caries infection and pyorrhoea.
<i>Azadirachta indica</i> A. Juss.	Neem	Meliaceae	Small branches are cut in to small pieces and used as tooth brush. Further Leafs used to treat toothache.
<i>Bambusa arundinacea</i> (Retz.) Roxb.	Baunsa	Poaceae	Small branches are cut in to small pieces and used as tooth brush to clean the teeth.
<i>Barringtonia acutangula</i> L.	Hinjal	Barringtoniaceae	Decoction of stem bark is used as mouth wash to cure toothache and gum problem.
<i>Brassica juncea</i> (L.) Czern. and Coss	Surso	Brassicaceae	Seed Oil (Mustard oil) gurgled for 10 to 15 minutes once a week to check all oral and dental affections.
<i>Buchanania lanzan</i> Spreng.	Char	Anacardiaceae	Small branches are cut in to small pieces and used as tooth brush to clean the teeth.
<i>Butea monosperma</i> (L.) Taub.	Palasa	Fabaceae	Shoot bark is burned to ash used as tooth powder for pyorrhoea and gum affection.
<i>Cajanus cajan</i> (L.) Millsp.	Kandul	Fabaceae	Small stem are cut into small pieces and used as tooth brush to clean the teeth.
<i>Capsicum frutescens</i> L.	Mircha	Solanaceae	Fruit juice is applied to the tooth cavity for toothache
<i>Carica papaya</i> L.	Amrubhanda	Caricaceae	Milky juice mixed with black salt and applied two times per a day to stop bleeding in gums
<i>Cinnamomum tamala</i> Nees.	Tejapatra	Lauraceae	The leaf decoction is gurgled two to three times. a day to check toothache. Dry powered leaf used as tooth powder.
<i>Citrus limon</i> (L.) Burm.f.	Kagjilembu	Rutaceae	Leaves used for scouring teeth and good as a mouth freshener
<i>Citrus medica</i> Linn.	Lembu	Rutaceae	Leaves and rind of fruits recommended for scouring teeth along with a pinch of rock salt. Fruit juice used for teeth whitening, to treat bleeding gums in scurvy, due to high content of Vitamin-C.
<i>Cocos nucifera</i> L.	Nadia	Areaceae	Roots are boiled and used as mouth rinse for treating toothache and tooth sensitivity.
<i>Curcuma longa</i> L.	Haldi	Zingiberaceae	About 2-3 gm of dry rhizome powder with a drop of mustard oil and a pinch of common salt used as tooth powder to protect the enamel, clean the teeth and remove bad breath of mouth.
<i>Emblica officinalis</i> Gaertn	Anla	Euphorbiaceae	Small branches are cut in to small pieces and used as tooth brush to clean the teeth, the fruits are a good source of Vitamin-C and used to treat bleeding gums and oral ulcers.
<i>Ficus benghalensis</i> L.	Bar	Moraceae	Leaf power is applied against gum swelling till cure.
<i>Ficus racemosa</i> L.	Dumer	Moraceae	Latex is applied against gum swellings till cure.
<i>Ficus religiosa</i> L.	Pipal.	Moraceae	Decoction of stem bark is used as mouth wash to remove the foul smell of breathing.
<i>Helianthus annus</i> L.	Surjamukhi	Asteraceae	Seed Oil used for gurgling for 10-15 minutes weekly to protect teeth and to remove bad breath.
<i>Hemidesmus indicus</i> (L.) R.Br.	Anantmoola	Asclepiadaceae	Leaf juice used to relive toothache
<i>Hibiscus rosa-sinensis</i> L.	Mandar	Malvaceae	Stem used as tooth stick in some parts of the district.
<i>Jatropha curcas</i> L.	Ramjada	Euphorbiaceae	Tender stems rich in latex invariably cut in to small pieces and used as toothbrush to cure pyorrhoea and toothache
<i>Justicia adhatoda</i> L.	Basang	Acanthaceae	Stem used as tooth stick to cure gum affections.
<i>Lawsonia alba</i> Lamk.	Benjati	Lythraceae	Bark of stem is chewed and kept between the teeth for about 20 minutes to cure toothache. Small stem is used as toothbrush.
<i>Madhuca indica</i> Gmel.	Mahul	Sapotaceae	Small branches are cut in to small pieces and used as toothbrush to clean the teeth, emerging in mustard oil to cure toothache. Further the stem bark with latex is used to cure pyorrhoea.
<i>Mangifera indica</i> L.	Amba	Anacardiaceae	Tooth brush of small stem is used to cure toothache; latex is applied to relieve gingivitis.
<i>Mentha virides</i> L.	Putna	Lamiaceae	Lives are chewed as mouth fresheners for avoid bad smell.

<i>Millettia pinnata</i> (L.) Panigrahi	Karanj	Fabaceae	Small branches are cut in to small pieces and used as tooth brush to clean the teeth. Tender leaf twigs are chewed and pressed between the teeth for about 15 minutes to cure toothache.
<i>Mimusops elengi</i> L.	Baula	Sapotaceae	Small branches are cut in to small pieces and used as tooth brush, Stem bark is mainly used in dental ailments like bleeding gums, pyorrhea, dental caries and looseness of teeth.
<i>Morus indica</i> L.	Tut	Moraceae	Twigs are used as tooth brush to clean the teeth.
<i>Mukia maderaspatna</i> (L.) Roem.	Agakmaki	Cucurbitaceae	Root is chewed for about 15 minutes to relieve toothache.
<i>Murraya paniculata</i> (L.) Jack.	Lesenga	Rutaceae	Tooth brush of stem is found to be effective to cure toothache.
<i>Ocimum sanctum</i> L.	Tulsi	Lamiaceae	Whole plant powder is allowed to boil in one Liter of water, when it comes to half then used as mouth wash to relive toothache. Further, Leaves from both black and white varieties are chewed to prevent bad breath.
<i>Phoenix sylvestris</i> Roxb.	Khajur	Areaceae	Young midriff of leaf are cut in to small pieces and used as tooth brush to clean the teeth.
<i>Piper nigrum</i> L.	Pipli	Piperaceae	The dried seeds are powdered and mixed with milk for the treatment of throat infection.
<i>Psidium guajava</i> L.	Maya	Myteraceae	Tender shoots widely used as tooth brush to cure pyorrhea and toothache, equal amount of leaf of <i>Mimusops elengi</i> and <i>Psidium guajava</i> are boiled in 500 ml of water and used as mouth wash to relive toothache.
<i>Punica granatum</i> L.	Dalimba	Lythraceae	Powers of dry leaves are used to cure bleeding gums and sores.
<i>Ricinus communis</i> L.	Jada	Euphorbiaceae	Cotyledon is fried in mustard oil and the smoke is emitted by this process is inhaled through the mouth and kept closed for about 10 minutes to relieve dental caries.
<i>Shorea robusta</i> Roth	Sargi	Dipterocarpaceae	Young branches are cut in to small pieces and used as tooth brush to clean the teeth.
<i>Sida acuta</i> Burm. f.	Bajarmuli	Malvaceae	Branches are cut in to small pieces and used as tooth brush to clean the teeth.
<i>Smilax zeylanica</i> L.	Muturi	Smilacaceae	Small branches are cut in to small pieces and used as tooth brush to cure toothache and pyorrhea.
<i>Solanum virginianum</i> Linn.	Bhejari	Solanaceae	Powder of dried fruit is used in cigarette and the smoke is kept inside the mouth for about 10 minutes to relieve dental caries.
<i>Streblus asper</i> Lour	Sahada	Moraceae	Tender shoot axis widely used as good quality tooth stick for dental care and cure to gum boils
<i>Syzygium aromaticum</i> (L.) Merrill & Perry	Labang	Myrtaceae	Flower bud should be chewed to prevent bad breath.
<i>Tamirindus indica</i>	Tentel	Caesalpiniaceae	Young branches are cut in to small pieces and used as tooth brush to clean the teeth.
<i>Terminalia arjuna</i> Retz.	Kau	Combretaceae	Young branches are cut in to small pieces and used as tooth brush to cure pyorrhea and toothache.
<i>Vitex negundo</i> L.	Nirgundi	Verbenaceae	Branches are cut in to small pieces and used as tooth brush to cure pyorrhea and toothache.
<i>Zingiber officinale</i> L.	Ada	Zingiberaceae	Paste of rhizomes is used to treat toothache and tooth decay.

Conclusion

An ethno-medicinal survey was conducted and data were collected by interviewing native and elderly people of Bargarh district in the state of Odisha, India engaged in health practice in different villages. The investigation reveals that 57 different important plant species belonging to 33 families are being commonly used. Besides, bark, leaf and rhizome as such or being processed are used as tooth powder. In few cases the latex, juice or oil extracted from seeds are either directly applied on the effected tooth and gums or gurgled for relief. Moreover, out of 57 plant species, 24 are exclusively used for tooth stick, 24 for toothache due to caries, 16 for gum diseases and 11 species for pyorrhea, used for oral health care. Maximum numbers of five species are reported each from family Fabaceae and Moraceae followed four species by member of Rutaceae and three species each from Liliaceae and Malvaceae. During the investigation it was observed that people Bargarh district still continue to depend on plant resources to meet their day-to-day needs and use plant based formulations from generation to generation for treatment of health related problems. This traditional knowledge is passed from generation to generation orally. There is no documentation of such knowledge and it is expected that with the death of elderly people the knowledge may be lost. Therefore, the present paper aims of documenting the traditional knowledge of dental and oral health care.

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